DOCUMENT RESUME

ED 174 999 CS 205 028

AUTHOR Myer, Bonnie J. F.
TITLE Research on Prose Comprehension: Applications for Composition Teachers.
PUB DATE Apr 79
NOTE 25p.: Paper presented at the Annual Meeting of the Conference on College Composition and Communication (30th, Minneapolis, Minnesota, April 5-7, 1979)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Composition (Literary); Descriptive Writing; Expository Writing; Higher Education; *Models; *Organization; *Reading Comprehension; Reading Research; Secondary Education; *Structural Analysis; Writing Skills
IDENTIFIERS *Schemata

ABSTRACT

Research shows that effectively used writing plans (models of text organization) promote understanding of messages and that students can learn to use these plans. Writing plans include overall plans (antecedent/consequent, comparison, description, and response), emphasis plans that highlight certain subtopics, and cohesion plans that refer to the rate at which new information is introduced and how to keep track of old information. Students learn these writing plans by examining magazine articles, advertisements, and other student compositions for their overall organization, subordination structure, signaling, and repetition of concepts. An occasional structural analysis of a writer's typical work also helps to evaluate that writer's overall writing plan and use of rhetorical relationships like emphasis and repetition. Since prose comprehension results from an interaction between the text and the reader's knowledge structures (schemata), distortions and confusions can occur when writers present readers with distorted or unfamiliar writing plans. On the other hand, writers can facilitate understanding of their work by matching appropriate writing plans to particular audiences. For example, with less proficient readers on an unfamiliar topic, several modifications in writing plans might be made, including explicit signaling of both the overall writing plan and the author's perspective, and using many identically worded, overlapping concepts. (RL)

**********
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
**********

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Bonnie J.F. Meyer

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

ED174999

# RESEARCH ON PROSE COMPREHENSION: APPLICATIONS FOR COMPOSITION TEACHERS

Bonnie J. F. Meyer[1, 2]

Arizona State University

Knowledge of writing plans plays an integral role in the composition process, according to a model proposed by Hayes and Flower.[3] In the planning stage of this model, a mental representation of the composition to be written is generated. The quality of this mental representation is dependent on the knowledge retrievable from a writer's long-term memory on writing plans, audiences, and topics, and how this knowledge can be integrated with the task demands of the particular composition assignment. The mental representation is used to guide writing. An editing process compares the text written with the writer's mental representation of the writing plan, audience, and topic to detect and correct errors. Thus, a reference point for major processes in this model is knowledge of writing plans.

A question of concern to teachers of composition in regard to this model is what kinds of knowledge do students need about writing plans in order to write effectively. Some answers to this question can be found from research conducted on reading comprehension. Factors related to writing plans have been found to influence reading comprehension. These research findings can provide insight into aspects of writing plans which are relevant when generating a mental representation for a particular composition. This discussion will be limited to writing tasks where the major purpose of the composition is to clearly communicate with a reader.

CS205028

Three levels of writing plans will be considered: overall writing plans, emphasis writing plans, and cohesion writing plans. Overall writing plans are ways of thinking about or organizing topics. Emphasis plans are ways to highlight certain subtopics within the overall writing plan. Cohesion writing plans refer to the rate at which new information is introduced and how to keep track of old information.

Overall Writing Plans

In discussing overall writing plans, the first issue to arise is whether any plan is necessary for communicating with a reader. Research tells us that overall writing plans promote more effective communication than random presentation of sentences[4] or paragraphs.[5] For example, investigators found greater efficiency in comprehension when paragraphs in passages occurred in logical rather than scrambled orders.[6] In this experiment, students read 1,400-word narrative passages and wrote summaries of the passages. Students who read the scrambled paragraphs required more reading time than those who read the logically ordered paragraphs. However, the summaries written by the two groups did not differ. When this study was replicated with severe limitations on reading time, inferior summaries were produced by the students who read the scrambled versions.

Thus, overall writing plans are necessary for efficient communication with readers. The next questions which arise are what are these overall writing plans, what kinds are available to writers, and what effects do they have on the comprehension of text by readers? The next sections of this paper will address these questions.

First, overall writing plans are typical forms of text that define it as a certain type. They are ways of organizing global content or topics,

but are independent of this content. For example, a contrastive overall writing plan can be used to compare two views. It is a contrastive writing plan regardless of whether it contrasts two views on the composition process or two views on Mideast policy. Overall writing plans have been referred to in the literature as an author's top-level structure,[7] an author's textual schema,[8] schematic structures,[9] and topoi or writing paradigms.[10]

Drawing on work in linguistics and rhetorics,[11] I have examined a number of overall writing plans and their use in reading comprehension. These overall writing plans fall into four basic groups: antecedent/consequent, comparison, description, and response.[12] The antecedent/consequent or covariance writing plan shows a causal relationship between topics. The comparison overall writing plan presents opposing or alternative viewpoints or events; these contrastive views or events can be equally weighted by the writer (alternative) or unequally emphasized (adversative). The description writing plan gives more information about a topic by presenting attributes, specifics, explanations, or settings. The who, what, where, when, and why approach of journalists is a specified description writing plan. The who and what refer to the agent, action, object, and instrument[13] in the major proposition on a topic, while the when, where, and why refer to setting and explanation types of descriptions of the topic.

The response writing plan includes the remark and reply, question and answer, and problem and solution formats. Scientific articles and fairy tales are often written with response writing plans. The scientific research report with its problem, method, results, and discussion is a

further specification of the response overall writing plan. In addition, overall writing plans for stories appear to be a specialized response writing plan. The development and study of story grammars has been a productive area of research in psychology during the last five years. Although story grammars proposed by various investigators[14] are slightly different, they picture stories from Western cultures as consisting of an episode in a setting. The episode consists of an event (or problem) plus a reaction (or solution). The reaction is broken down further into such categories as internal response, attempt, outcome, and ending. In stories from other cultures, the response writing plan may be specified in different ways.[15]

My students and I have examined the effects on reading comprehension of these four basic writing plans that are commonly found in expository text. In a series of studies with ninth-grade students, we examined whether good readers utilize these overall writing plans when they read. We have had over 300 ninth graders read well-organized passages of expository text written with problem-solution, comparison, and description overall writing plans.[16] Immediately after reading the passages and one week later, the students wrote down everything they could remember from the passages. These rewritings based on their memory of the passages are called recall protocols. We scored the recall protocols for the amount of information recalled from the passage and whether or not they were organized with the same overall writing plan as the passage read.

We found that slightly less than 50% of the students wrote recall protocols with the same overall writing plan as the author of the text. Most students who did not use the author's overall writing plan use a

modified random plan. They simply listed ideas from the passage in the order that they thought of them without attempting to relate them together into a unified whole.

In addition, most of the ninth-grade students rated by standardized reading comprehension tests and their teachers as high in reading comprehension used the same overall writing plan for organizing their recall protocols as the author of the passage, while most students with low reading comprehension did not. Students who used the same writing plan as the author remembered much more information from passages than those who did not. The major ideas posited in the passages were particularly well remembered by these students both immediately and a week after reading. They also remembered more detailed information. Additionally, students who used the same overall writing plan as the author performed better on true/false tests of passage content administered a week after reading the passages.

In summary, the research shows that ninth-grade students who utilize overall writing plans parallel to those used by authors of well-organized texts remember more information from their reading than those who do not. These overall writing plans appear to provide good readers with a systematic, organized strategy for encoding information from text and retrieving it from memory. The skilled readers appear to approach text with knowledge of how texts are conventionally organized and look for the way in which a particular text is organized. Few use overall writing plans that differ from the author's. Most ninth graders could not employ an alternate plan in a study where they were instructed to use an overall writing plan for their recall protocol that was different from that in the text, but logically feasible.[17]

In contrast to good readers, ninth-grade students with poor reading comprehension skills appear to approach text without knowledge of overall writing plans used by authors and no effective strategy for organizing information from the text they read. Their primary expectation for expository text appears to be that it lists some things that they should remember. Failure to utilize overall writing plans in text particularly impairs their performance on unfamiliar topics commonly found in school materials, such as railroad development and problems with supertankers. It is less crucial with familiar material where numerous prior knowledge structures on a topic in memory can increase their likelihood of remembering ideas to list in their recall protocol.[18]

To further investigate the value of overall writing plans for readers, we taught ninth-grade students to identify the four commonly used overall writing plans in expository text and to use them in their recall protocols.[19] Students in a week-long instruction group and a control group read and recalled passages prior to instruction, one day after instruction, and three weeks after completion of instruction. The instruction led to significantly increased identification of the overall writing plans used in a text and its use in recall protocols. In addition, the amount of information recalled by the instructed group on each of the posttest sessions was nearly double that of both their pre-instruction scores and the scores of the control group for all testing sessions. The study showed that ninth graders can be taught to recognize overall writing plans and that this instruction improves their reading comprehension.

We have not yet systematically studied the use of overall writing plans with readers of various ages or background. However, we have looked

at this factor with some adult readers. In a sample of junior college students, slightly more than 50% used the author's overall writing plan in their recall protocols; those students who employed this strategy remembered more than those who did not.[20] In samples of graduate students and college graduates in young, middle, old-age ranges, most use the same type of overall writing plan as they read in well-organized passages. However, they appear to be able to employ alternate writing plans as evidenced by a group of graduate students who rejected a proposed solution in a passage written with a response plan and instead employed comparison or antecedent/consequent overall writing plans in their recall protocols.[21]

Overall writing plans can also be taught in undergraduate composition classes. Some composition textbooks teach these types of overall writing plans.[22] A repertoire of overall writing plans should facilitate both writing and reading performance. Students writing compositions with clearly specified overall writing plans will certainly communicate more efficiently with their readers.

A final question to consider in discussing overall writing plans is whether some are more effective than others. Although we have not thoroughly investigated this issue, we have some data which answer this question in part. In a listening experiment, recall and retention differed from two passages with the same topics and specific content but different overall writing plans.[23] In this experiment with graduate students, greater free recall and correct answers to questions resulted from the passage written in a comparison overall writing plan than the passage written with the attribution type of descriptive writing plan. The greater efficiency of

the comparison writing plan has been replicated with different topics and with proficient ninth-grade readers and college graduates from young, middle, and old age ranges.[24] However, poorer readers do not appear to be able to take advantage of the superior comparison writing plan.[25] Writers need to be acutely aware of various overall writing plans and to realize that their choice and use of these plans is an important variable in effective communication.

In their composition model, Hayes and Flower[26] mention that writing plans can be drawn from long-term memory or may be generated by organizing subprocesses during the planning stage of writing. These overall writing plans seem to be drawn from long-term memory. Whether they are voluntarily drawn from declarative knowledge,[27] or automatically drawn from procedural knowledge depends on the writer. On the other hand, the writing plans of emphasis and cohesion are frequently generated during the planning stage.

Emphasis Writing Plans

Two types of emphasis writing plans will be discussed: subordination and signaling. Subordination refers to the superordinate and subordinate relationships among subtopics in a composition. Signaling refers to the explicit statement of these relationships and the highlighting of specific information in text.

There has been substantial research in psychology specifying hierarchical relationships of text and relating this hierarchical structure to what people remember after reading it.[28] In the prose analysis system which I employ,[29] all the information from a text is represented in a detailed outline or tree structure. The resulting content structure from the analysis procedure shows how some ideas in the passage are superordinate

to other ideas. As can be seen in Figure 1, some ideas from a passage are located at the top levels of the content structure and they correspond to the main ideas, gist, or macrostructure of the text. Other ideas are found at middle levels and correspond to supporting details, while others are found at the bottom levels of the content structure and correspond to very specific details such as 200,000 sea birds seen in the analysis of the passage on supertankers. The top-level ideas dominate their subordinate ideas. The lower-level ideas describe or give more information about the ideas above them in the structure.

---

Insert Figure 1 about here

---

Labels from case grammar[30] and the semantic grammar of propositions[31] classify the interrelationships among ideas. Case grammar classifies relationships within simple sentences, while rhetorical relationships show the relationships among sentences, paragraphs, and larger text segments. The rhetorical relationships which tie the entire composition together are the overall writing plans previously discussed. As seen in the figure, rhetorical relationships are also identified which tie together subtopics within the overall writing plan.

The analysis is a propositional analysis system; certain predicates or relationships dictate moving down a level in the structure and thereby form the hierarchical tree structure. For example, description varieties of rhetorical relationships subordinate some propositions to others. The superordinate proposition is frequently stated first in a text followed by supporting attributes which add color or quality or a specific example.

These descriptive propositions are placed a level lower in the hierarchical structure than the proposition they describe.

The research using this structure or similar types shows that propositions located at the top levels of the structure are recalled and retained better over time than information at lower levels. This effect of structure has been confirmed with various types of materials, recall tasks, and learners.[32] An explanation for this effect is that top-level propositions are processed differently than low-level propositions; they are more frequently retrieved from long-term memory to be related to incoming propositions in working memory.[33]

Applying these findings to the teaching of writing, students in composition classes could outline their compositions to see if ideas they deem important are located at the top levels in an outline similar to the one in the figure. Important propositions buried at lower levels in the structure can be elevated by discussing them earlier in the discussion of a subtopic and adding description to the propositions. Another fruitful activity for composition classes may be specifying rhetorical relationships among propositions to detect ambiguity. In specifying rhetorical relationships among sentences and paragraphs in experimental materials, we have discovered confusion resulting from multiply embedded antecedent/consequent relationships and over whether propositions were causally related or simply contiguous in time. Then, we have collapsed or deleted some of the embedded causal relationships and resolved ambiguity by the use of signaling.

Signaling[34] can clarify ambiguous text by explicitly stating the relationship between propositions. Examples of signaling for causal

relationships include, therefore, as a result, so that, in order to, because, and thus. For comparison relationships common signaling words include in contrast, however, and on the other hand.

The explicit statement of the structure of relationships between propositions is one type of signaling, but there are others.[35] Other types include summary statements, preview statements or prematurely revealed information abstracted from content occurring later in text, and pointer words, such as "an important point is."[36] Signaling does not add new information; instead, it makes rhetorical relations explicit and increases the salience of propositions by repetition or pointer words.

In a study with ninth-grade readers, the effects of signaling in a passage about supertankers was examined.[37] One group of students read the same version of the passage as reproduced below; in this version the problem/solution overall writing plan is explicitly stated and a preview and enumeration of the three-part solution is stated. The other group read a paraphrased version of the passage that deleted all signaling, the words in italics in the following passage.

> A *problem of vital concern* is the prevention of oil spills from supertankers. A typical supertanker carries a half-million tons of oil and is the size of five football fields. A wrecked supertanker spills oil in the ocean; this oil kills animals, birds, and microscopic plant life. *For example,* when a tanker crashed off the coast of England, more than 200,000 dead seabirds washed ashore. Oil spills *also* kill microscopic plant life which provide food for sea life and

produce 70 percent of the world's oxygen supply. Most wrecks result from the lack of power and steering equipment to handle emergency situations, such as storms. Supertankers have only one boiler to provide power and one propeller to drive the ship.

*The solution to the problem* is not to immediately halt the use of tankers on the ocean since about 80 percent of the world's oil supply is carried by supertankers. *Instead, the solution lies in the training of officers of supertankers, better building of tankers, and installing ground control stations to guide tankers near shore. First,* officers of supertankers must get top training in how to run and maneuver their ships. *Second,* tankers should be built with several propellers for extra control and backup boilers for emergency power. *Third,* ground control stations should be installed at places where supertankers come close to shore. These stations would act like airplane control towers, guiding tankers along busy shipping lanes and through dangerous channels.

Signaling had no effect on students with high standardized test scores in reading nor on those with low standardized test scores. The high comprehenders recognized and used the author's problem/solution writing plan regardless of signaling and the low comprehenders were not able to utilize the problem/solution structure in either case. However, average comprehenders and students whose comprehension stanines scores were a stanine below their vocabulary scores benefited from signaling.

It increased their use of the problem/solution writing plan in their recall protocols and increased the amount of information they could recall. Similar facilitative effects of signaling have been found for junior college students,[38] but not college students.[39]

Both signaling and subordination writing plans can be used by authors to show their perspective on a topic. Evidence indicates that these writing plans should be used in harmony rather than emphasizing totally different propositions.[40]

Cohesion Writing Plans

Cohesion writing plans deal with the problem of relating previously stated information within the text. Haviland and Clark have labeled this problem as the given-new contract.[41] According to their hypothesis, integration in memory of new information from a sentence is a three-step process. First, the learner extracts the familiar or given information from the sentence. The second step is to match the familiar information to an antecedent already present in memory. The third step is to revise memory by attaching the unfamiliar or new information to the established antecedent. Comprehension is facilitated if the learner has one obvious antecedent in memory[42] and if the antecedent is still in working memory rather than long-term memory.[43] If the antecedent was processed in the immediately preceding sentence, it is more likely to be in working memory and efficiently integrated.[44] Antecedents which are located in superordinate positions in a structural analysis of text are also more likely to be repeatedly found in working memory[45] and are more efficiently integrated.[46]

Working memory is limited in capacity. Kintsch and Vipond[47] assume that most readers have 6 to 10 propositions in working memory for integrating

the new information with already processed information. Failure to find overlap of concepts between these propositions and new information increases processing time while the reader searches long-term memory or rereads the text for antecedents. If this search proves unsuccessful, the reader initiates an inference process which further drains working memory resources and contributes to difficulty in comprehension. These problems are compounded for the poor reader who must expend working memory capacity on decoding and has less capacity for keeping antecedents in working memory.

These research findings indicate that writers should provide frequent repetition of concepts. Hayes-Roth[48] argues that for effective integration of information from text not only should there be overlapping concepts, but that the same words should represent these concepts in text.

Conclusion

In summary, students can be taught basic overall writing plans and ways to show their perspective by subordination and signaling. Magazine articles, advertisements, and classroom compositions can be scrutinized for their overall organization, subordination structure, signaling, and repetition of concepts. An occasional structural analysis of a writer's own composition would be helpful in evaluating his or her use of an overall writing plan, rhetorical relationships, emphasis, and repetition.

Selection and use of overall writing plans and writing plans of emphasis and cohesion must be decided in regard to constraints of topics and characteristics of audiences. Comprehension of text results from an interaction between the text and the knowledge structures or schemata that readers bring to it. One type of schemata that readers bring to

text corresponds to overall writing plans,[49] such as comparison or story grammar. Distortions and confusions in the communication process between writers and readers can occur when writers present readers with distorted overall writing plans[50] or writing plans of stories from different cultures.[51] On the other hand, communication can be facilitated if writers select overall writing plans which are readily used by particular audiences, such as comparison writing plans for college graduates with proficient reading skills. In addition, writing plans of emphasis and cohesion should be matched to audiences. For example, with less proficient readers on an unfamiliar topic, several modifications in writing plans should be made. These include the use of explicit signaling of the overall writing plan and author's perspective and many identically worded overlapping concepts.

FOOTNOTES

[1]An earlier version of this article was presented as an invited address at the Conference on College Composition and Communication, Minneapolis, April 1979.

[2]Some of the research presented in this paper was supported in part from Faculty Grants at Arizona State University.

[3]J. R. Hayes and L. S. Flower, Protocol Analysis of Writing Processes, Paper presented at the annual meeting of American Educational Research Association, Toronto: Ontario, Canada (1978).

[4]L. T. Frase, "Paragraph Organization of Written Materials. The Influence of Conceptual Clustering upon Level of Organization," Journal of Educational Psychology, 60 (1969), pp. 394-401.

[5]W. Kintsch, T. S. Mandel, and E. Kozminsky, "Summarizing Scrambled Stories," Memory and Cognition, 5 (1977), pp. 547-552.

[6]Ibid.

[7]B. J. F. Meyer, R. O. Freedle, and C. H. Walker, Effects of Discourse Type on the Recall of Young and Old Adults, Unpublished Arizona State University paper (1978), p. 33; B. J. F. Meyer, "The Structure of Prose: Effects on Learning and Memory and Implications for Educational Practice," in R. C. Anderson, R. Spiro, and W. E. Montague (Eds.), Schooling and the Acquisition of Knowledge (Hillsdale, New Jersey: Lawrence Erlbaum Associates, 1977); B. Bartlett, Use of Top-Level Structuring as an Organizational Strategy in Prose Recall, Dissertation in progress, Arizona State University (1978).

[8]B. J. F. Meyer, D. M. Brandt, and G. J. Bluth, Use of Author's Schema: Key to Ninth-Graders' Comprehension, Paper presented at the meeting of the American Educational Research Association, Toronto: Ontario, Canada (1978).

[9]T. van Dijk, "Relevance Perception in Discourse Comprehension," Working notes, University of Amsterdam (May, 1978).

[10]Aristotle, The Rhetoric of Aristotle, trans., Lane Cooper (New York: Appleton-Century-Crofts, 1960).

[11]J. Grimes, The Thread of Discourse (The Hague: Mouton, 1975).

[12]B. J. F. Meyer, The Organization of Prose and Its Effects on Memory (Amsterdam: North-Holland Publishing Co., 1975).

[13]C. Fillmore, "The Case for Case," in E. Bach and R. G. Harms (Eds.), Universals in Linguistic Theory (New York: Holt, Rinehart and Winston, 1968).

[14]J. M. Mandler and N. S. Johnson, "Remembrance of Things Parsed: Story Structure and Recall," Cognitive Psychology, 9, (1977), pp. 111-151; D. E. Rumelhart, "Notes on a Schema for Stories," in D. G. Bobrow and A. M. Collins (Eds.), Representation and Understanding (New York: Academic Press, 1975); N. L. Stein, "How Children Understand Stories: A Developmental Analysis," in L. Katz (Ed.), Current Topics in Early Childhood Education, Vol. 2 (Hillsdale, New Jersey: Ablex, in press); P. Thorndyke, "Cognitive Structures in Comprehension and Memory of Narrative Discourse," Cognitive Psychology, 9, (1977), pp. 77-110; T. A. van Dijk, "Narrative Macrostructures: Logical and Cognitive Foundations," PTL: A Journal for Descriptive Poetics and Theory of Literature, 1 (1976), pp. 547-568.

[15]F. C. Bartlett, Remembering (Cambridge, England: Cambridge University Press, 1932); B. N. Colby, "A Partial Grammar of Eskimo Folktales," American Anthropologist 75 (1973), pp. 645-662; G. E. Rice, The Role of Cultural Schemata in Narrative Comprehension, Unpublished doctoral dissertation, University of California, Irvine (1978).

[16]B. Bartlett (1978); D. Brandt, Prior Knowledge of the Author's Schema and Prose Comprehension, Dissertation in progress, Arizona State University (1978); B. J. F. Meyer, "Following the Author's Top-Level Structure," in R. Tierney, J. Mitchell, and P. Anders (Eds.), Understanding Readers' Understanding (Hillsdale, New Jersey: Lawrence Erlbaum Associates, in press); B. J. F. Meyer, D. M. Brandt, and G. J. Bluth (1978).

[17]D. Brandt (1978).

[18]D. Brandt (1978); B. J. F. Meyer (in press).

[19]B. Bartlett (1978).

[20]B. J. F. Meyer, V. Woods, and B. Bartlett, Facilitative Effects of Passages with the Same Structure and Different Content on Prose Recall, Unpublished manuscript, Arizona State University (1978), p. 32.

[21]B. J. F. Meyer and R. O. Freedle, Effects of Discourse Type on Recall, Manuscript submitted for publication (1979), p. 33.

[22]F. J. D'Angelo, Process and Thought in Comprehension (Cambridge, Massachusetts: Winthrop Publishers, Inc., 1977).

[23]B. J. F. Meyer and R. O. Freedle (1979) p. 33.

[24]D. Brandt (1978); B. J. F. Meyer, G. E. Rice; C. Knight, and J. Jessen, Effects of Comparative and Descriptive Top-Level Structures on the Reading Performance of Young, Middle, and Old Adults, Arizona State University, paper in preparation.

[25]D. Brandt (1978); B. J. F. Meyer, R. O. Freedle, and C. H. Walker (1978).

[26]J. R. Hayes and L. S. Flower (1978).

[27]P. J. Gamlin, Writing as Intention, Paper presented at the annual meeting of the American Educational Research Association (Toronto: Ontario, Canada, 1978).

[28]W. Kintsch and J. M. Keenan, "Reading as a Function of the Number of Propositions in the Base Structure of Sentences," Cognitive Psychology, 5 (1973), pp. 257-274; B. J. F. Meyer, Idea Units Recalled from Prose in Relation to Their Position in the Logical Structure, Importance, Stability and Order in the Passage, Unpublished master's thesis, Cornell University (1971); B. J. F. Meyer (1975).

[29]B. J. F. Meyer (1975).

[30]C. Fillmore (1968).

[31]J. Grimes (1975).

[32]W. Kintsch and J. M. Keenan (1973); J. M. Mandler and N. S. Johnson (1977); B. J. F. Meyer (1971, 1975, and 1977); and P. Thorndyke (1977).

[33]W. Kintsch and T. A. van Dijk, "Toward a Model of Text Comprehension and Production," Psychological Review, 85 (1978), pp. 363-394.

[34]B. J. F. Meyer (1975).

[35]Ibid.

[36]Ibid.

[37]B. J. F. Meyer, D. M. Brandt, and G. J. Bluth (1978), p. 31.

[38]N. Marshall, The Structure of Semantic Memory for Text, Unpublished doctoral dissertation: Cornell University (1976).

[39]N. Marshall (1976); B. J. F. Meyer (1975).

[40]E. Kozminsky, "Altering Comprehension: The Effect of Biasing Titles on Text Comprehension," Memory and Cognition, 5 (1977), pp. 482-490; B. J. M. Meyer (1975).

[41]S. E. Haviland and H. H. Clark, "What's New? Acquiring New Information as a Process in Comprehension," Journal of Verbal Learning and Verbal Behavior, 13 (1974), pp. 512-521.

[42]Ibid.

[43]A. M. Lesgold and C. A. Perfetti, "Interactive Processes in Reading Comprehension," Discourse Processes, 1 (1978), pp. 323-336; W. Kintsch and T. A. van Dijk (1978).

[44]B. Hayes-Roth and P. W. Thorndyke, "Integration of Knowledge from Text," Journal of Verbal Learning and Verbal Behavior (in press).

[45]W. Kintsch and T. A. van Dijk (1978).

[46]C. H. Walker, Integrating Information from Text, Unpublished doctoral dissertation, Arizona State University (1978).

[47]W. Kintsch and D. Vipond, "Reading Comprehension and Readability in Educational Practice and Psychological Theory," in L. G. Nilsson (Ed.), Proceedings of the Conference on Memory: University of Uppsala (Hillsdale, New Jersey: Lawrence Erlbaum Associates, in press).

[48]B. Hayes-Roth, Structurally Integrated Versus Structurally Segregated Memory Representations: Implications for the Design of Instructional Materials, Rand Paper P-5841, Santa Monica, California (1977).

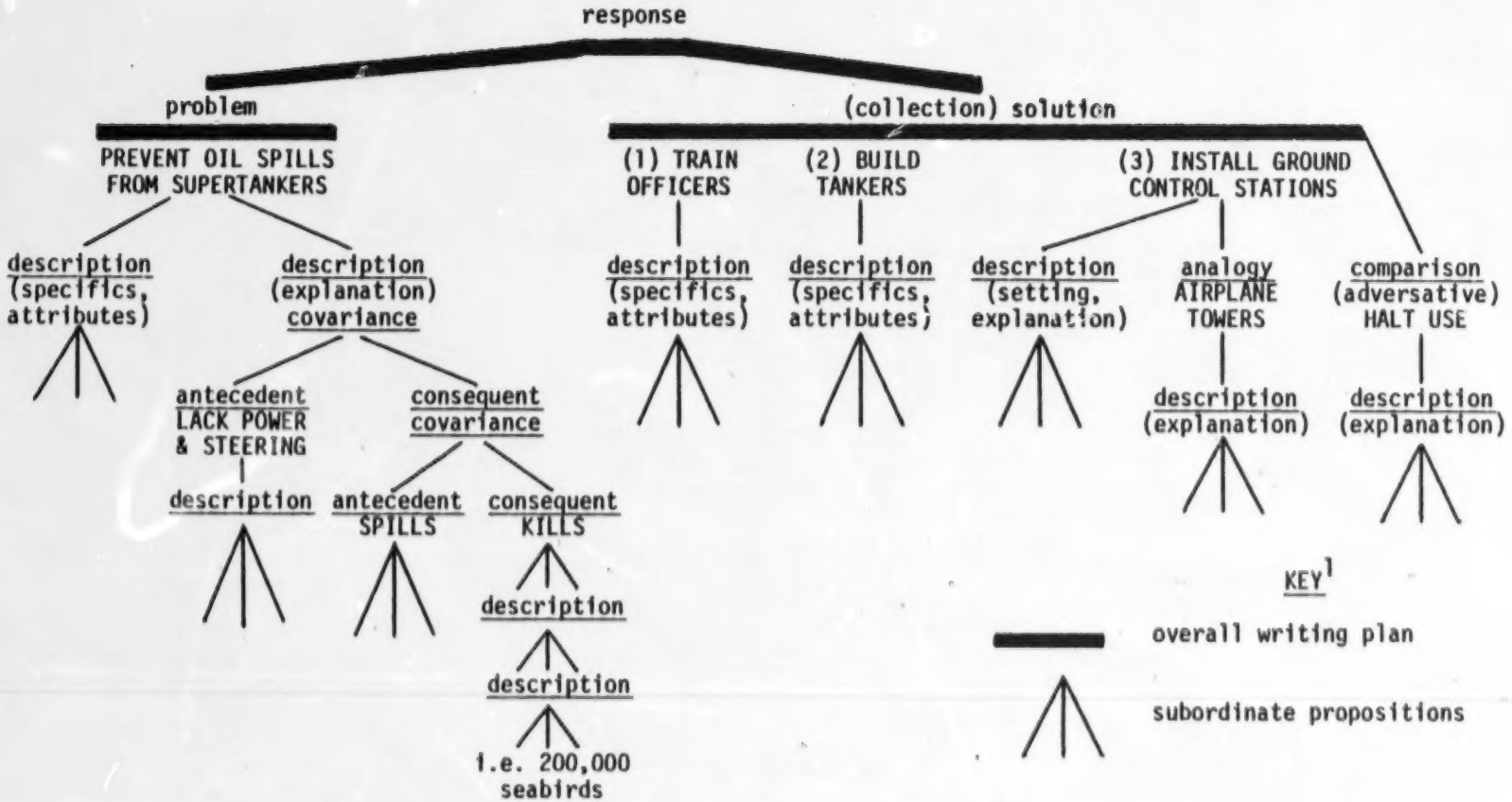
[49]R. C. Anderson, "The Notion of Schemata and the Educational Enterprise," in R. C. Anderson, R. J. Spiro, and W. E. Montague (Eds.), Schooling and the Acquisition of Knowledge (Hillsdale, New Jersey: Lawrence Erlbaum Associates, 1977); B. J. F. Meyer (in press).

[50]P. Thorndyke (1977).

[51]F. C. Bartlett (1932); G. E. Rice (1978).

## FIGURE CAPTION

Figure 1. The response: problem/solution overall writing plan shown in a structural analysis of a passage on supertankers adapted from an article appearing in Read magazine.




[1]Actual passage can be found on pp. 11-12 of the text.